

An Introduction of High Density Apple Orchard Establishment among Bhotiya Tribal community of Bhatwari Block of Uttarkashi of Uttarkhand State

Mahendra Pal Singh Parmar¹ and Shanti Parmar²
Department of Botany Govt. P.G College Uttarkashi(UK)¹
Sankalp Samajik Sanstha Uttarkashi²
Email-mahen2004@rediffmail.com

SUMMARY

The proposed project area falls under Bhatwari development block of Uttarkashi district covering four villages namely Mukhwa, Dharali, Harsil & Bagori. This proposed area traditional horticulture is going on since last 50 years and they grow only Apple and still they are planting apple seedlings 120 plants per acre whereas nearby state i.e Himanchal is growing 600 plants per acre. It means to increase the production and double the income of farmers, by implementing the High Density plantation in Harsil Area of Uttarkashi. The proposed area has limited land so through high density Apple production maximum production could be get minimum land.

Uttarkashi district is located in the catchment of two major river system of India i.e. Ganga and Yamuna and tributaries. The district lies between N 300 27' latitude and E 780 54' to 790 25' longitude and has a total geographical area approximately 8016 sq. km. Among of which 21% land Agriculture or Horticulture land so traditional crop like cereal plants are *Tritium vulgare* (wheat), *Oryza sativa* (rice) and that make about 75% of total cereals of Uttarkashi rest Zea maiz (Maize) . The minor cereal plants viz *Elusine Corsicana* (samak) etc. and pseudo cereals like *Fagopyrum esculentum* (kutu), *Amaranthus causation* (Ramdana) etc are included in remaining 25% of cereals. More than eight species of family Papilionaceae viz. *Dolichos lab lab* (Sem), *Glycine max* (soybean), *Pisum sativum* (matar), *Lens esculentum* (masoor), *Phaseolus munga* (urd), *Phaseolus radiatus* (moong), *Vigna sinensis* (Rajama) etc were produced organic methods except Rice and Wheat still today and now lack of fertility farmers using heavy infestation of chemicals and land regularly decreasing their fertility`

Key Words:- Apple, High Density, Economic assistance , Bhotiya Tribe, Harsil, Uttarkashi

Introduction

High density apple orchards offer many advantages Small, closely planted trees facilitate cultural operations, and they may increase early production and produce better fruit.

About 80% of the total population of the target area is dependent on the Horticulture for their livelihood. Terraced slopes cover about 80% of the hill agricultural land, which is completely dependent on the climate, whereas remaining 20% area lies in the V shape valleys, which is fairly irrigated. Horticulture of this region is very common of suitable as due to favorable climatic condition like temperature, chilling et.

Presently farmers of the area growing apple traditionally i.e 120 trees per acre where as in this proposed techniques 600-800 trees can be planted at one acre .

White et al. (1997).



The systems that put the trees closest together (such as the super spindle) cost more per acre to begin with since you have to buy a lot more trees and trellising, industry analysts suggest super spindle orchards also bring in the most profit by the eighth year because apple yields are higher, **Parker et.al,** . Those of us growing trees in the backyard are probably less concerned about economics and more concerned with cramming as many varieties as possible into a small space without committing to an excessive amount of maintenance.

The project is unique in the area as no apple grower farmers is using this technology in their fields. It is only demonstrated by some of the Horticulture Universities in the State but so far it is not being practiced in the proposed area of Harsil Valley. Even this practice has not been adopted by the farmers of Uttarkashi district.

The proposed area is highly productive for apple . With the start of the project in their area, farmers have opportunity to interact with bankers, technical experts and other institutions. So the project is not only be useful for cultivation of Apple but it will lead to improvement in horticulture practices for other crops also. **Costa et al. (1997)** reported that ' HD apple' is the most productive cultivar across all the planting densities in trial.

The project is unique in Harsil area as rarely it is being practiced by the farmers in their fields. It is being taught in Universities / Research Stations but nowhere, it has been extended to real time situation in farmer fields. Villagers only doing traditional practices and getting less yield from maximum area. When this type of organized projects takes shape in their fields, they may become part of their real life and will become source of good income to their families. When there will be increase in income, all round development of rural area will follow.

MATERIAL AND METHODS

: For the implementation we have selected four ST villages of Bhatwadi Block of Uttarkashi district and the census detail of villages are as following

Sr.	Details of The Village	Village	Village	Village Bagori	Village	Total

No		Mukhwa	Harsil		Dharali	
1	District	Uttarkashi	Uttarkashi	Uttarkashi	Uttarkashi	
2	<i>Taluka/Block</i> <i>/Tehsil</i>	Bhatwari	Bhatwari	Bhatwari	Bhatwari	
3	Height from Sea Level (MSL)	2500	2450	2400	2550	
4	No. of House Holds	170	55	370	121	716
5	No. of Tribal House Holds.	39	35	370	43	487
6	Total Population	1001	564	1206	594	5934
7	Total Male Population	569	104	651	299	2797
8	Total Female Population	432	96	755	295	2757
9	Total ST Population	124	345	1289	102	2839
10	Total ST Male Population	57	167	592	55	1341
11	Total ST Female Population	67	178	697	47	1498
12	Total SC Population	129	19	117	69	1343

13	Total SC Male Population	57	10	63	44	669
	Total SC Female Population	72	09	54	25	679

It has been observed above Census data, the population of female is higher than male which shows the either female feticides is nothing here or female are equal as male.

Before the implementation of this research project, line survey was carried out by PI and PF of their land location, lat/lon , soil etc and four visit done by authros and some progressive Tribal farmers at different institute i.e Central instutue of Temrated Research Garhmuktesshwar (CITH) , Sher E Kashmir University Agriculture Science and Technology Shrinagar and Farmers field at Narkanda, Kotkhai,Thanedar of Himanchal Pradesh (HP) where farmers are growing High density apple successfully. Thereafter farmers give their acceptance for limited land only one nail (0.02Ha).

1st year we get 15 to 20 apples per tree the second year, 50 to 60 the third year, 100 apples the fourth year, and a bushel the fifth year if you start with well-feathered trees (**Pankaj Nautiyal 2014**). Finally we have selected gala varieties of apple for Harsil area among of which fulfut gala, crimson gala and scarlet gala etc. Gala apple is heart-shaped and has distinctive yellow-orange skin with red striping. With a crisp, sweet taste that can't be beat, Gala is great in salads. The detail of High Density apple establish at Harsil area is as following annexure 1

Annexure –1 (Cost of Cultivation)							
Density :- 120 plant/acre							
Sr . N o	varieties - All gala varieties Operations	Apple		varietie s	Pears		Amount in .
		Year 1	Year 2	Year 3	Year 4	Year 5	Total

1	Planting Material +10% mortality & transportation cost	12,500		0	0	0	12,500
2	Manure & Fertilizer	600	1,100	1,500	2,000	3,000	8,200
3	PP Chemicals	500	700	900	1,100	1,300	4,500
4	Herbicides	300	600	900	1,100	1,300	4,200
5	Inter cropping	2,500	0	0	0	0	2,500
	Subtotal (A)	16,400	2,400	3,300	4,200	5,600	31,900
B	Labour						
6	Layout & staking	150	0	0	0	0	150
7	Digging of pits	1,200	0	0	0	0	1200
8	Filling up of pits	500	0	0	0	0	500
9	Planting	200	0	0	0	0	200
10	Application of M&F	200	200	200	200	200	1000
11	Irrigation	750	750	750	750	750	3750
12	Spraying of PP chemicals	200	300	400	500	600	2000
13	Pruning/Training	500	1,000	1,500	2,000	2,500	7500
14	Inter Culture	500	500	500	500	500	2500
	Sub Total (B)	6750	2750	3350	3950	4550	21350
	Grand Total (A+B)	23150	5150	6650	8150	10150	53250

The objective of selection high density apple varieties were ST farmers have limited land, old varieties apple, problem of maturing, different kind of size shape and taste etc. Still today farmers are planting only 120 trees in a acre whereas under this technology it goes 3- 5 times i.e 360-600 tree per acre . Initially we started 360 tree per acre which are growing successfully and this year we will get 1st harvest.

RESULTS

After successful establishment of High Density apple trees at Harsil area we got following results of income and expenditure.

Income and Expenditure though traditional Pattern			Income and Expenditure though High Density Pattern	
Year	Average cost through traditional pattern For 120 plants	Pure income (production - expenditure) per Acre	Average cost through High density pattern For 600 plants per acre	Pure income (production - expenditure) per Acre
1st year	(a)Planting materials, Plant protection per plant (medicine, etc.)	-9250	600x150=90000	-90000
	Total= 9250		=90000	-90000
2nd year	Cutting, pruning and plant protection 22@plant x100=2200 (After10% mortality 100 plants will be remain)	-5150	20apples from one plant 20x600=12000 150boxes@1200 =1.80LACS	LESS10% MANAGEMENT COST 1.60 LACS
3rd year	Cutting, pruning and plant protection = 5150	-6650	40apples from one plant 40x600=24000 300boxes@1200 =3.60LACS	3.30 LACS
4th years	Cutting, pruning and plant protection	-8150	80apples from one plant	6.40 LACS

			80x600=48000 600boxes@1200 =7.20 LACS	
5th year	Cutting, pruning and protection= 10150	15000- 10150=4850	100appleS from one plant 100x600=60000 750boxes@1200 =9.0 LACS	8.0 Lacs
In above table seems that High density fruit yield from 2nd years and apple plant traditionally planted gives their yield from 5th year onwards, so High Density apple orchard establishment is essential for this proposed limited land holding area of ST.				

ACKNOWLEDGEMENT

Authors are grateful to Natural Resource Data Management System (**N.R.D.M.S**) of Department of Science and Technology (**DST**) Govt. of India for financial assistance and specially thanks to Dr. Bhoop Singh (Director N.R.D.M.S) and Dr. Ashok Kumar (Principal Scientific officer (PSO) NRDMS Division DST), who guided us time to time for the success of this project at ST villages. Authors are also thankful to NABARD Uttarakhand, District Development Manager Mr. Gajendra Singh Chaudary (AGM NABARD) and Dr. Suresh Chandra Mangain (Associate professor Govt. P.G. College Uttarkashi), who guided me the study. We are also thankful to great ST population of Bhatwadi block Uttarkashi

REFERENCES

1. White, Gerald B., and Alison De Marree, Economics of Apple Orchard Planting Systems. Information Bulletin 227, Cornell Cooperative Extension, Cornell University, 1997.

2. Parker Michael, C. Richard Unrath ,Charles Safley. High Density Apple Orchard Management, Horticulture and Resource Economics (TreeFruits/Pecans), Horticultural Science , USA
3. Costa G, E. Beltrame, P.E. Zerbini, A. Pianezzola High density planted apple orchards: Effects on yield, performance and fruit quality .
4. Nautiyal Pankaj, "An Introduction of Ultra High Density fruits" K.V.K. Chinyali Saur Uttarkashi. (Ph.D Thesis)
5. Parmar Mahendra Pal Singh and Shanti Ramola (2016). An Introduction of High Density Apple Orchard Establishment at Tribal Villages of Bhatwari Block of Uttarkashi District on *CROP DIVERSITY AND ENTREPRENEURSHIP DEVELOPMENT IN HIMALAYAN ENVIRONMENT" Pp 53*